6 drops
30 days

0000009

KERR-McGEE CHEMICAL CORPORATION RESPONSES TO U.S. EPA REGION V COMMENTS ON HEALTH AND SAFETY PLAN of the SCOPING AND PLANNING DOCUMENTS

FOR THE EXCAVATION AND RESTORATION PHASE AT THE LINDSAY LIGHT II SITE CHICAGO, ILLINOIS

Prepared By:
Kerr-McGee Chemical Corporation
and
Grant Environmental, Inc.
September 3, 1996

KERR-MCGEE'S REVISIONS TO THE HEALTH AND SAFETY PLAN OF THE SCOPING AND PLANNING DOCUMENTS FOR THE EXCAVATION AND RESTORATION PHASE AT THE KERR-MCGEE LINDSAY LIGHT II SITE

September 3, 1996

HEALTH AND SAFETY PLAN - DOCUMENT 400

66. Document 400, page iv--Clarify if the area code for the Offsites Manager is still 708. Also, change the U.S. EPA telephone number to the Region V 24-hour #: (312) 353-2318.

    Response: The area code in West Chicago has been changed to 630; therefore, the telephone number for the Offsites Manager is (630) 293-6332. The contact name was changed from U.S. EPA to U.S. EPA Region V 24-hour Emergency Number and the number was revised as above.

67. Document 400, page 4-5--Regulatory references should be to 10 CFR 20 not 32 IAC 340.

    Response: The following paragraph was added to the end of Section 1 in the Removal Action Workplan:

    "References to the Illinois Department of Nuclear Safety (IDNS) regulations exist in these documents. The IDNS regulations are usually more restrictive that US Nuclear Regulatory Commission (NRC) regulations. However, whenever there is a conflict between IDNS and NRC regulations, the NRC regulations will be used to determine compliance."

    The following footnote was added to pages 4-5 and 4-6:

    "The IDNS regulations are usually more restrictive that US Nuclear Regulatory Commission (NRC) regulations. However, if there is a conflict between IDNS and NRC regulations, the NRC regulations will be used to determine compliance."

68. Document 400, page 7-1--Regulatory references should be to 10 CFR 20 not 32 IAC 340.

    Response: See responses to comment 67.

69. Document 400, page 7-2, para. 1--The radon decay product decay times used in procedures in this document are not consistent. SOP-212 uses 5 hours. Health and Safety Plan Document 400 (on page 7-2) uses 4 hours. For consistency, U.S. EPA is setting a 5 hour decay time.

Response: The radon decay product decay times were revised to 5 hours in the Health and Safety Plan.

70. Document 400, page 7-2, para. 1--If filters are decayed for 4 days before thoron measurements are made there could be several days delay from the time high thoron concentrations are generated and there is a recognition of this problem. Therefore, U.S. EPA is prescribing that, after filters have been collected and decayed overnight, there should be a morning count of the filter that will serve to identify high gross counts for the previous day. This will alert health & safety staff of a potential problem which they can investigate more promptly. The count, after 4 days decay, will still serve to be the official measurement of Pb-212.

Response: The following paragraph was added to the end of Section 7.2:

"After filters have been collected and decayed overnight, there will be a morning count of the filter that will serve to identify high gross counts for the previous day. This will alert health & safety staff of a potential problem which they can investigate more promptly. The count, after 4 days decay, will serve to be the official measurement of Th-Alpha."

71. Document 400, page 7-3, para. 1--Clarify what action level will be used for worker contamination that is fixed. Explain what action will be taken with these workers. Also, list the airborne contaminants expected and how often they will be monitored, monitoring equipment such as a combustible gas meter, etc.

Response: Based upon the Characterization and Investigation Report (October 27, 1995), Kerr-McGee does not anticipate encountering organic vapors that may be present at the water table. However, information pertaining the to exposure risks and monitoring for organic vapors has been added to the document.

A section on Total Organic Vapor Monitoring was added to the document as Section 7.7 (Action Levels became Section 7.8) Section 7.7 reads as follows:

7.7 Total Organic Vapor Monitoring

In addition to the radiological contaminants, there is a slight potential of encountering organic vapors. Organic vapors were encountered near the water table during previous investigation at the site. Routine screening for total organic vapors will be conducted with a photoionization detector (PID), or similar type equipment, on a daily basis. The screening will evaluate ambient photoionization volatile organic vapors and some semi-volatile organic vapors.

Total organic vapors in ambient air will be obtained periodically with a PID during daily field activities. The PID provides real-time readings of exposure to volatile organics and some semi-volatile organics. Measurements will be

made daily, prior to activities, to determine background levels. Monitoring measurements will be taken when:

- operations change,
- work moves to a different portion of the Site, and
- personnel observe contaminated materials,

These screening operations will be used to identify conditions requiring an upgrade to full-face respirators as described in Section 7.8.2.

Additional information was added to Section 7.8, Actions Levels. The section was divided into two sections. The existing text was placed under a new subheading entitled Section 7.8.1, Radiological Action Levels. The following information was added under Section 7.8.2, Organic Vapor Action Levels:

7.8.1 Organic Vapors Action Levels

Kerr-McGee is taking a conservative approach to organic vapor monitoring at the Site. A PID will be used to monitor for organic vapors. Operations will be discontinued if the PID reads 5 ppm[1] or greater and the area will be evacuated. The Site Health and Safety Officer will retest the area wearing a full-face respirator. Operations will not resume until the PID reads less than 5 ppm and remains below 5 ppm.

[1] PID level obtained for benzene from NIOSH Pocket Guide to Chemicals Hazards.

72. Document 400, page 7-4--Reference or explain the origin of values such as 2 DAC-hours, 25% of the DAC, and 250 pCi/100 cm^2.

Response: References were made to explain the origin of values. A copy of the revised table (page 7-4) is enclosed.

73. Document 400, page 9-1, Evaluation--The referenced handbook is the Radiological Health Handbook.

Response: The reference was revised to read:

"Personnel Decontamination in the Radiological Health Handbook."

74. Document 400, page 13-4, Section 13.4.2--Monitoring toxic gases or dusts at 5 parts per million should be clarified since a list of possible contaminants has not been included with this document.

Response: See response to comment 71.

75. Document 400, page 13-4, Section 13.4.3--Change having air-purifying respirator available to self-contained breathing apparatus. Include a discussion on retrieval.

Response: The section was revised to read:

"Acceptable rescue procedures include entry by a team of rescuers only if the appropriate self-contained breathing apparatus (SCBA) is available; or use public emergency services.

The standby worker must trained in first aid, CPR, and respirator use. A first aid kit should be on hand and ready for emergency use. The standby worker must be trained in rescue procedures. Retrieval of an unconscious victim in a confined space will only be conducted by trained rescue personnel. An emergency call to 911 will be initiated to assist the victim."

76. Document 400--Somewhere in this document you should include a detailed site map showing clean zone/support zone, decontamination zone and exclusion zone/hot zone. Also, the following statement should be included in this document - This plan will meet the requirements of OSHA 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response, 1910 and 10 CFR. In addition, there should be a place for all workers, visitors to acknowledge their reading and understanding of the health and safety plan.

Response: The following information was added to the end of Section 3:

"Work zones will be established at the site. These zones include clean/support zones, decontamination zones, and exclusion zones. Although the clean/support zones are anticipated to remain fixed, other zones will move about the site as drilling and excavation work progresses. Figure 3.1 shows the impacted areas where exclusion zones may be established during excavation activities."

A copy of the figure is enclosed.

A section entitled, "Site Control Plan for Delineation Drilling," was added to the Draft Delineation Drilling Program. A copy of the program is enclosed.

The following paragraph was added to the end of Section 1, page 1-1.

"This plan meets the requirements of OSHA 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response, and applicable subparts of OSHA 29 CFR 1926, 1910 and 10 CFR. Visitors will be required to review the health and safety plan and read and sign the visitor information sheet (Figure 1.1)."

A copy of the visitor information sheet is enclosed.

77. Appendix B, Document 402--Explain why this appendix has been deleted. Explain what will be used in it's place.

Response: The appendix was replaced by the following procedures:

- Respirator Training, Selection and Use
- Respirator Protection Equipment Inspection and Maintenance
- Operation of the Model 8020 Portacount Plus for Quantitative Respirator Fit Testing

Copies of the draft procedures are enclosed.

ATTACHMENT FOR COMMENT 72

Revised Table 7-1
Action Levels as Determined by Radioactivity

TABLE 7-1

ACTION LEVELS AS DETERMINED BY RADIOACTIVITY

Note: Personnel shall not be exposed to airborne radioactivity such that their weekly intake exceeds 12 Derived Air Concentration (DAC)-hours without prior approval of the Field Team Leader or designee.

Level of protection may be increased to Level C (full-face air purifying respirator) when airborne monitoring indicates that contamination levels have reached 30% of the DAC. All assessments shall incorporate ALARA principles. Engineering controls shall be used prior to assignment of respiratory protective equipment.

Signs shall be posted at entrances to areas where airborne radioactivity levels exceed, or have the potential to exceed, 25% of the DAC.

Radiation Type	Action Level	Level of Respiratory Protection/Action
a. Contamination on smear samples	250 pCi/100 cm^2 gross alpha[(a)]	Consider modified Level C (full- face APR) based upon ALARA evaluation.
b. Airborne Radioactivity	30% DAC[(b)]	Consider Level C (full-face APR) based upon ALARA evaluation. Ensure proper posting. Consider internal monitoring
c. Ambient Gamma (work areas)	5 mrem/hr[(c)]	Consider procedures for shielding of soils. Ensure proper posting.
d. Ambient Gamma (off-site areas)	2 mrem/hr[(d)]	Implement immediate controls to reduce dose equivalent rate.

Notes

(a) Approximately 3 times the unrestricted release criteria in the NRC Regulatory Guide 1.86

(b) Potential Airborne Radioactivity Area as defined in 10 CFR 20

(c) The ambient gamma dose equivalent rate action level of 5 mrem/hr stems, from the 10 CFR 20 radiation area definition.

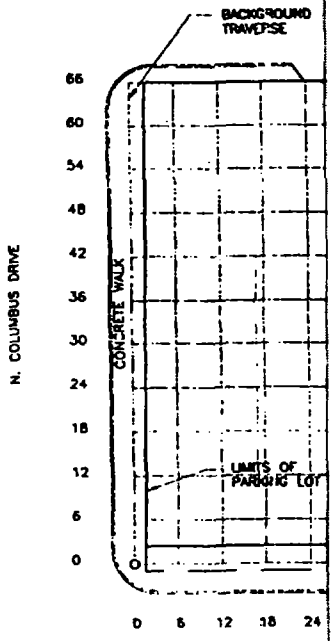
(d) The ambient gamma action level for off-site is based upon the 10 CFR 20 requirements to maintain dose equivalent rates in unrestricted areas such that they do not exceed 0.002 rem in any one hour.

ATTACHMENTS FOR COMMENT 76

Figure 3.1
Impacted Areas of Lindsay Light II Site

Draft Proposed Site Control Plan for Delineation Drilling

Figure 1.1
Visitor Information Sheet



N. COLUMBUS DRIVE

SCALE IN FEET

0' 0 40'

OVERLAND GAMMA SURVEY GRID

OVERLAND GAMMA SURVEY GRID (AREA REFERENCE NO.)

-HOLE GAMMA SURVEY (WITH STATION REFERENCE)

PLE LOCATION (WITH STATION REFERENCE)

SINS

BORING LOCATION (DELINEATION PROGRAM)

NO.	DESCRIPTION	DATE	BY
1	RESPONSE TO USEPA COMMENTS	7-16-84	RGB

DRAWN BY GRS DATE 7-15-84

DESIGNED BY RGB DATE 7-15-84

APPROVED BY RGB DATE 7-15-84

CADFILE J:\CROSSDWG\27315\27313ZH\27313ZH2.DWG

1:40

GAMMA RADIATION SURVEY
SHOWING ELEVATED GAMMA AREAS DOWN-HOLE LOG LOCATIONS AND SOIL SAMPLE LOCATIONS

LINDSAY LIGHT II
316 E. ILLINIOS ST.
CHICAGO, ILLINOIS

STS Consultants Ltd.
Consulting Engineers

STS PROJECT NUMBER
27313-ZH

STS PROJECT FILE
273132H2

SCALE
1"=40'

ATTACHMENT A-1

Delineation Drilling Outline - Lindsay Light II Site.

Summary

This Delineation Drilling outline is intended to describe the general guidelines and mechanics to be used to better define the extent of affected soils requiring excavation and removal from the Lindsay Light II site, at 316 E. Illinois Street, Chicago, Illinois. This outline provides the instructions for surveying, drilling, and sampling of soil to collect additional data to better characterize the extent of contamination, within the former Stable Location and especially in areas outside of the Stable Location.

The overall goals of this delineation drilling program are:

- to better identify the extent of contamination (within the Stable Area and outside of the Stable Area), both horizontally as well as vertically, .
- to identify areas of unaffected soil that may lie encircled within the affected areas, and that could be segregated from surrounding contaminated soils during excavation, and
- to refine the estimated extent (horizontal and vertical) of required excavations to clean-up this site.

The information gathered during this delineation drilling program will be used to develop field reports that could be used for guiding future excavation activities. In addition, the field report finding also will be used to guide additional drilling, as needed, that may fall outside of what has been outlined here. Upon completion of delineation drilling, the data from field reports will be compiled and issued as a progress report. This report will include the following:

- Narrative summary of work accomplished.
- Map(s) identifying the drilled boring locations and transect.
- Map(s) identifying the estimated horizontal extent of affected soil.
- Cross section(s) identifying the estimated vertical extent of affected soil.
- Discussion and justification of deviations from the outlined procedure during actual fieldwork.

Starting Borings & Transect

The starting boring locations for this work effort are shown on enclosed drawing (modified Figure 3-1 from the STS Report of October 27, 1995). These indicated borings and transect locations for drilling and sampling are based upon available prior information that was developed as part of previous investigations and engineering studies. Additional drilling, when needed based upon field reports, that is outside of presently known affected area, will use a stepping out procedure as described below.

The indicated transect are intended to be about 10 feet apart and will extend away from the source area towards an area which is believed to have uncontaminated soil.

Initial Gamma Survey & Area Marking

To begin with, first the former Stable Area (Area #7 in Figure 3-1) will be gamma surveyed (taken at 1 cm above ground surface using NaI(Tl) detector in a 2 ft square grid) and the outline of the potentially affected area marked using a spray paint. Next the other eleven known affected areas (shown in Figure 3-1) will be gamma surveyed and the outline of the potentially affected areas are marked. The surface outline of this potentially contaminated area from this areal survey will then be used to further identify and define the overall boundary of the contaminated areas.

Borehole Drilling and Logging

Borings will begin starting at the indicated boreholes. This requires the use of a hollow-stem, continuous flight auger drill. While the borehole is advancing simultaneous splitspoon core collection will occur. As each borehole is advanced, geologic logging of the borehole will be performed from the cuttings returned to the surface or from the continuous core. After the expected terminal depth of boring has been reached, the soil core will be withdrawn. Gamma logging equipment is then lowered inside the hollow-stem auger for logging of the borehole. If field observations show that boring integrity is maintained after the auger flights are withdrawn, then in some instances, for increased sensitivity, gamma logging could occur using a temporary PCV casing (of appropriate size) that has been lowered and placed in the borehole.

Initial depth for each borehole will be 5 feet, unless special circumstances require it to be less (e.g. avoiding buried drainage pipe, etc.). Each subsequent borehole increment will be of 2.5 feet in length till the needed depth (to reach uncontaminated soil) has been reached.

Upon completion of the gamma logging, the borehole will abandoned per approved procedure, and the location marked for subsequent surveying and for inclusion on a map.

Any additional borings that are done along the trisect using the stepping-out/stepping-in process will follow the same procedure for logging and sampling as discussed above.

Soil Sampling

Soil sampling will be performed in accordance with KM Procedure SOP-214. In summary, sample will be analyzed from the bottom of each borehole that has been extended to uncontaminated soil. A split spoon sampling tool (2.5 or 3 inch diameter size) will be used to obtain a continuous core soil sample. The split spoon bottom sample location shall be 6 inches below the point of uncontaminated soil activity as measured by the gamma log. For instance, the core sample is 7.5 feet but the gamma log shows that the uncontaminated soil is observed starting at a depth of 5 feet; the split spoon bottom sample will then be obtained from the 5 to 5.5 feet depth increment of the core. Analysis of additional core increments may occur, at the discretion of the Company.

Depending upon the results of the field gamma logging, besides this bottom sample other samples, from above or below the tentatively identified point of uncontaminated soil, may also be submitted for radiological analysis to ascertain that the vertical extent of affected soil has been indeed identified and defined for that borehole.

Stepping-Out Procedure

Additional boreholes along the transect will be "stepped out" or "stepped in" to define the horizontal and vertical extent of radioactive soil according to the following steps:

1) If the gamma log for the starting borehole shows presence of contaminated soil, then a next borehole along the transect will be drilled and gamma logged. The hole location of this hole will be at a distance of 10 feet and it will be drilled to a minimum depth of 5 feet (unless field gamma logging indicates extra depth is needed to reach background activity). Upon reaching uncontaminated soil activity the 6-inch core segment representing hole bottom will be analyzed.

2) This process will be repeated till a transition point has been identified (where one boring indicates some contaminated soil whereas the next outward adjacent boring indicates only uncontaminated soil).

3) Once a transition point has been located, one last borehole along that transect will be drilled midway between the last two boreholes. It will be logged and sampled as before.

This step-out/step-in procedure will be followed for all indicated transect locations. Additional transects may be added based upon field reports. However, in all cases the transect will be extended outward from the current estimated boundary limits.

Geological logs of the borings will be prepared from visual descriptions of the cuttings or the continuous core. The activity of the affected soil will be identified from the gamma logs. The gamma log readings will be reported for depth increments of 6 inches. The vertical extent of contamination at each borehole will be correlated with adjacent borings and interpolated between boring locations to identify contaminated soils to arrive at the total excavation volume estimate.

Site Control Plan for Delineation Drilling

Portions of the parking will be closed during drilling, radiation measuring, and sampling activities. This area will vary daily and range from around one-tenth to one-quarter of the parking lot. Site activities will be scheduled to minimize the disruption, to the extent possible, of normal lot operations.

The immediate area around the drilling rig will be designated as the exclusion zone. This zone will be marked using yellow/magenta radiation zone rope supported about three feet above ground level. The area surrounding the exclusion zone will be designated as the general working zone. This zone will be marked using orange traffic cones. Public parking will not be allowed within the general work zone. Arrangements will be made with the parking lot manager to schedule closing portions of the parking lot

Figure 1.1

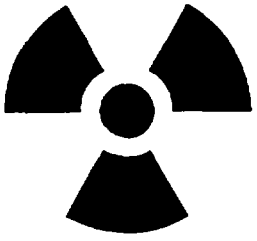
KERR-McGEE CHEMICAL CORPORATION

LINDSAY LIGHT II SITE

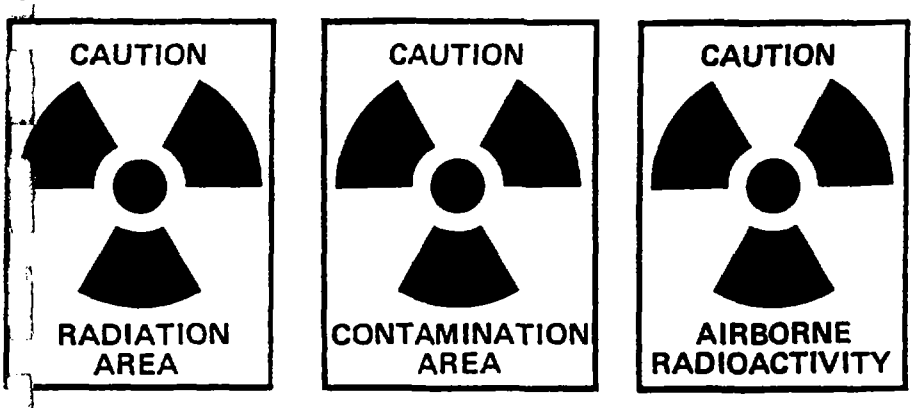
4-4792

VISITOR INFORMATION

NOTICE TO VISITOR: ALL VISITORS MUST BE ESCORTED AT ALL TIMES WHILE ON THIS SITE.



CAUTON. Radioactive materials are present on this site. Radioactive materials may be found throughout the site. Grounds, buildings and equipment have low levels of contamination.



CONTROLLED AREAS: Do not enter areas with these signs unless you have an escort or health physics has given specific approval and you understand access limitations.

You must wear protective clothing in controlled areas. Health physics will provide you with instructions.

You must wear a personal radiation dosimeter if you enter an area which is controlled.

No smoking, eating, drinking or chewing in controlled areas.
NO EXCEPTIONS.

You may request to see radioactive materials license for this facility as granted by the USNRC.
Notify Health Physics if you do not understand these instructions.

NAME _____ DATE _____

ATTACHMENTS FOR COMMENT 77

Draft Respirator Training, Selection and Use Procedure

Draft Respiratory Protection Equipment Inspection and Maintenance Procedure

Draft Operation of the Model 8020 Portacount Plus for Quantitative Respirator Fit Testing Procedure

RESPIRATOR TRAINING, SELECTION AND USE

KERR-McGEE CHEMICAL CORPORATION

WEST CHICAGO FACILITY

REVIEWED BY: Jeffrey L. Williams DATE: 5-1-95
Quality Assurance Supervisor

REVIEWED BY: [signature] DATE: 5-2-95
Site Manager

APPROVED BY: R. A. Thompson DATE: 5/16/95
Project Manager

PROCEDURE NO: 334 REVISION NO: 1

RESPIRATOR TRAINING, SELECTION AND USE

1.0 SCOPE

1.1 Purpose

1.1.1 To provide a formalized training program outline delineating the requirements that personnel must fulfill prior to using respirators for protection against airborne radioactive material.

1.1.2 To assure proper selection, supervision, issuance, field testing, and use of respiratory protective devices.

1.2 Applicability

This procedure applies any time respiratory protection devices are used, for the protection of personnel from airborne radioactive material.

2.0 REFERENCES

2.1 32 Illinois Administrative Code, Parts 310 and 340, Standards for Protection Against Radiation

2.2 32 Illinois Administrative Code, Part 400, Notices, Instructions and Reports to Workers; Inspections

2.3 West Chicago Project, Health and Safety Plan for Decommissioning Activities at the Kerr-McGee Chemical Corporation Rare Earths Facility, West Chicago, Illinois

2.4 NUREG-0041, "Manual of Respiratory Protection Against Airborne Radioactive Materials"

2.5 West Chicago Project, Project Training Program WCP 100.

3.0 DEFINITIONS

3.1 Airborne Radioactivity Area

This term defines radiation conditions within a specified area. An area where the average concentration of airborne radioactivity could allow an individual to exceed 12 DAC-hrs over a one week period.

3.2 Derived Air Concentration (DAC)

Airborne activity levels found in Appendix A of 32 IAC 340.

3.3 Derived Air Concentration-Hour (DAC-hour)

DAC-hour is the product of the concentration of radioactive material in air and the time of exposure to that radionuclide.

3.4 Protection Factor (PF)

The protection factor is a measure of the degree of protection afforded by a respirator, and is defined as the ratio of the concentration of airborne radioactive material outside the respirator to that inside the respirator under conditions of use.

3.5 Special Work Permit (SWP)

A document which describes the radiological conditions of the work area or task and delineates safety and radiation protection requirements to be followed in the work area or when performing the task. If respiratory protection devices are required for a task, they will be specified on an SWP.

4.0 REQUIREMENTS

4.1 Prerequisites

4.1.1 Prior to using ***respirators for protection against airborne radioactive material, an individual must be fit-tested and medically cleared for respirator use.***

4.1.2 Individuals shall be clean shaven and shall not have facial hair styles that could interfere with the respirator fit, form or function.

4.2 Tools, Material, Equipment

4.2.1 Student handouts, training videos.

4.2.2 Half or full face respirators.

4.2.3 Irritant smoke tester.

4.3 Precautions, Limits

4.3.1 Use only the respiratory protective device specified by Health Physics personnel.

4.3.2 Movement of the mouth, chin and facial muscles should be kept to a minimum to avoid breaking the mask-to-face seal.

4.3.3 Do not use filter canister devices in oxygen deficient atmospheres.

4.3.4 Eyeglasses are to be worn only with approved adapters.

4.3.5 No worker will be allowed to work in an area exceeding 50 times DAC.

4.4 Acceptance Criteria

Individuals have completed respiratory protection training, fit testing and are medically cleared prior to using respirators.

5.0 PROCEDURE

5.1 The following topics will be discussed in the initial formal classroom training:

5.1.1 Kerr-McGee Respiratory Protection Policy Statement

5.1.2 Airborne Contaminants

a. Sources

b. Derived Air Concentrations (DAC) and DAC-HR definitions

c. DAC-HR exposure to dose comparison

5.1.3 Qualifications to Use Respirators

a. Medical clearance

b. Training

c. Fit Testing (qualitative vs. quantitative)

5.1.4 Respirators (each type in use)

a. How equipment is ***constructed***

b. How does it operate

c. How they are issued and returned

d. Proper donning and removal of respirators

e. Field testing requirements prior to use

f. Equipment's limitations

g. Applicability to various situations

5.1.5 Respirator Use

a. Respirator use is considered the last resort in protection of workers from airborne radioactive material. In recognition of this philosophy, respirator usage normally falls into two categories:

Nonroutine - use of respirators to protect workers when engineering/process controls do not provide adequate protection against actual or potential airborne radioactivity.

Emergency - use of respirators to protect workers when immediate action is required which precludes evaluation and or application of engineering/process controls.

b. Respirator use should be restricted to short work periods. Work periods, wearing a respirator, should not exceed 3 hours.

c. All respirator users have the right to leave the work area and remove the respirator for relief in the event of:

1. Equipment malfunction

2. Physical or psychological stress

3. Procedural or communication failure

4. Significant deterioration of operating conditions

5. Any other condition requiring relief

d. Respirators users are requested to seek relief before psychological or physical stress become unbearable.

5.2 The following topics, at a minimum, will be discussed in the annual retraining:

5.2.1 Kerr-McGee Respiratory Protection Policy Statement.

5.2.2 Respirator issuance, field testing and equipment return.

5.2.3 Actions in the event of respirator malfunction.

5.3 Upon completion of training, a Training Attendance Sheet (see reference 2.5), will be completed and sent to the Health Physics Supervisor to update the individual's training records.

5.4 Selection of Respiratory Protection Devices

5.4.1 Engineering controls shall be considered prior to the prescription of respiratory protection equipment.

5.4.2 After engineering controls have been evaluated and employed and respiratory protection is still needed, the selection of the proper respiratory protection equipment by Health Physics will be based on the following considerations.

a. Nature and extent of the hazard.

b. Nature and extent of the job.

c. Characteristics and limitations of the respirator.

5.4.3 Health Physics personnel will select the respiratory protective equipment and enter it on the appropriate SWP. The following PF data is from Appendix A of 32 IAC 340.

a. Air purifying half face respirator in negative pressure mode:

1. PF = 10 for particulates

b. Air purifying full face respirator in negative pressure mode:

1. PF = 50 for particulates

c. Air purifying full face respirator in positive pressure mode:

1. PF = 1000 for particulates

5.5 Issuing Respiratory Protection Devices

5.5.1 Health Physics personnel should verify for each individual who will wear a respirator:

a. Current medical (within the last year).

b. Current respirator training (within the last year).

c. Type of mask(s) fit tested.

5.5.2 Health Physics personnel will then issue the respiratory protective device to that individual only if the Respirator Issuance Record Form (Attachment 1) has been returned.

5.5.3 A full face respirator will NOT be issued to an individual who is not clean shaven. Individuals shall be clean shaven and shall not have facial hair styles that could interfere with the respirator fit, form or function.

5.6 Supervision of the Use of Respiratory Protection Devices

Health Physics personnel will provide radiological support, as appropriate for the use of respirators. The SWP for the work to be performed will establish the health physics coverage requirements.

5.7 Use of an approved half face mask with filter cartridge.

5.7.1 CAUTION: Do not use cartridges in oxygen deficient atmospheres.

5.7.2 Complete the Respirator Issuance Record form and give to health physics.

5.7.3 Check the mask and cartridge or canister for possible damage.

5.7.4 If applicable, remove protective tape from the cartridge.

5.7.5 Open the straps of the mask fully.

5.7.6 Put on the respirator by placing the chin into the face piece first and adjust the straps to afford a tight fit. (Check to make sure the seal is free of hair.)

5.7.7 Perform a negative pressure test by sealing off the cartridge with the palm of the hand and inhaling. Hold for about 5 seconds. If properly adjusted, there will be a slight collapse of the sides of the face piece.

5.7.8 Perform a positive pressure test by sealing off the exhalation valve with the palm of the hand and exhale gently so that a slight positive pressure is built up in the face piece. If no outward leakage of air is detected at the periphery of the facepiece, the fit is satisfactory.

5.7.9 Perform an irritant smoke test.

a. The respirator user may leave the area at any time for relief from respirator use in the event of equipment malfunction, physical or psychological distress, procedural or communication failure or any other condition that might require such relief.

5.7.10 Upon completion of the job or at the end of the day, bag or return the respirator to the dirty respirator box.

5.7.11 Complete the Respirator Issuance Record form.

5.8 Employment of an approved full face mask with filter cartridge.

5.8.1 **CAUTION**: Do not use cartridges in oxygen deficient atmospheres.

5.8.2 Complete the Respirator Issuance Record form and give to health physics.

5.8.3 Check the mask and cartridge or canister for possible damage.

5.8.4 If applicable, remove the protective tape from the cartridge.

5.8.5 Open all the straps of the mask to their full extent.

5.8.6 Put on the respirator by placing the chin into the face piece first and adjust the straps to afford a tight fit. (Check to make sure the seal is free of hair.)

5.8.7 Perform a negative pressure test by sealing off the cartridge with the palm of the hand and inhaling. Hold for about 5 seconds. If properly adjusted there will be a slight collapse of the sides of the face piece.

5.8.8 Perform a positive pressure test by sealing off the exhalation valve with the palm of the hand and exhale gently so that a slight positive pressure is built up in the face piece. If no outward leakage of air is detected at the periphery of the facepiece, the fit is satisfactory.

5.8.9 Perform an irritant smoke test.

a. The respirator user may leave the area at any time for relief from respirator use in the event of equipment malfunction, physical or psychological distress, procedural or communication failure or any other condition that might require such relief.

5.8.10 Upon completion of the job or at the end of the day, bag or return the respirator to the dirty respirator box.

5.8.11 Complete the Respirator Issuance Record form.

6.0 RECORDS/REPORTS/NOTIFICATIONS

6.1 Training Attendance Sheet ***shall be maintained as quality records.***

6.2 The respirator issuance record form ***shall be maintained as quality records.***

6.3 If a respirator malfunctions during use, ***notification shall be made*** to Health Physics personnel ***as soon as possible.***

6.4 ***DELETED***

7.0 ATTACHMENTS

7.1 Attachment 1 Respirator Issuance Record Form

Attachment 1

RESPIRATOR ISSUANCE RECORD FORM

Issue of Respirator

DATE: _____ TIME: _____

NAME: _____ ID NO: _____

SWP NO: _____

TYPE OF RESPIRATOR: _____

RESPIRATOR NUMBER: _____

_____
SIGNATURE

Return of Respirator

DATE: _____ TIME: _____

HOURS USED: _____

[ ] RESPIRATOR FUNCTIONING PROPERLY

[ ] RESPIRATOR DAMAGED OR NOT FUNCTIONING

_____
SIGNATURE

RESPIRATORY PROTECTION EQUIPMENT

INSPECTION AND MAINTENANCE

KERR-McGEE CHEMICAL CORPORATION

WEST CHICAGO FACILITY

REVIEWED BY: Jeffery L. Williams DATE: 5/14/95
Quality Assurance Supervisor

REVIEWED BY: [signature] DATE: 5-17-95
Site Manager

APPROVED BY: R. A. Thompson DATE: 5/23/95
Project Manager

PROCEDURE NO: 335 REVISION NO: 2

RESPIRATORY PROTECTION EQUIPMENT INSPECTION AND MAINTENANCE

1.0 SCOPE

1.1 Purpose

To ensure that respiratory protection equipment is in full operating condition.

1.2 Applicability

This procedure provides instructions to ensure that each respirator is properly cleaned and sanitized prior to use, and is inspected and maintained in accordance with the manufacturer's recommendations.

2.0 REFERENCES

2.1 32 Illinois Administrative Code, Parts 310 and 340, Standards for Protection Against Radiation

2.2 32 Illinois Administrative Code, Part 400, Notices, Instructions and Reports to Workers; Inspections

2.3 West Chicago Project, Health and Safety Plan for Decommissioning Activities at the Kerr-McGee Chemical Corporation Rare Earths Facility, West Chicago, Illinois

2.4 Kerr-McGee Procedure "Respirator Training, Selection and Use"

2.5 NUREG 0041 "Manual of Respiratory Protection Against Airborne Radioactive Materials"

2.6 MSA Respirator Equipment Manuals

2.7 Glenaire Respirator Equipment Manuals

3.0 DEFINITIONS

3.1 Airborne Radioactivity Area

An area where the average concentration of airborne radioactivity could allow an individual to exceed 12 DAC-hrs over a one week period.

3.2 Derived Air Concentration (DAC)
Airborne activity levels found in Appendix A of 32 IAC 340.

3.3 Derived Air Concentration-Hour (DAC-hour)

DAC-hour is the product of the concentration of radioactive material in air and the time of exposure to that radionuclide.

3.4 Protection Factor (PF)

The protection factor is a measure of the degree of protection afforded by a respirator, and is defined as the ratio of the concentration of airborne radioactive material outside the respirator to that inside the respirator under conditions of use.

4.0 REQUIREMENTS

4.1 Prerequisites

Individuals performing maintenance or inspections have been trained.

4.2 Tools, Material, Equipment

4.2.1 Screwdrivers, pliers.

4.2.2 New lenses, valves and other manufacturer's approved, spare parts.

4.2.3 MSA cleaner-sanitizer solution or equivalent.

4.3 Precautions, Limits

4.3.1 Proper respirator function depends on the correct respirator maintenance. Often maintenance of respirators requires disassembly and re-assembly of the unit to replace worn or faulty parts. Improper re-assembly can cause a respirator malfunction.

4.3.2 Only parts approved for the specific respirator shall be used for maintenance (i.e., MSA parts in MSA respirators; Glenaire parts in Glenaire respirators) ***refer to reference 2.6 & 2.7 above.*** This is required to maintain the NIOSH approval for the respirator.

4.3.3 All replacement parts should be inspected before use. Discard warped or improperly fitting parts. Do not reuse nicked or torn gaskets.

4.3.4 Insure that parts which work correctly in only one direction (i.e., valves, valve seats, straps, lenses, etc.) are oriented properly. Also, be certain that the proper gasket is used in the correct location and all screw fittings or snaps are snug.

4.4 Acceptance Criteria

A cleaned respirator shall have no detectible removable contamination; shall be less than 100 dpm/100cm² fixed alpha contamination; and less than 1000 dpm/100cm² fixed beta-gamma contamination.

5.0 PROCEDURE

5.1 Decontamination of Respirators

5.1.1 Perform a contamination survey of the respirator and record the results on Attachment 2. (Radiological Survey Data Sheet)

5.1.2 Remove the filter cartridge(s) and check for radioactivity.

a. Any cartridge showing fixed alpha activity above 100 dpm/100 cm^2 will be ***discarded.***

b. Any cartridge showing ***detectable*** removable activity will be discarded.

c. Report the respirator number of any cartridge that indicates excessive activity.

d. Perform a smear survey on the internal surfaces of the respirators that have contaminated cartridges.

5.1.3 Wash respirators with an approved cleaner-sanitizer solution such as one 2-ounce packet of MSA Cleaner-Sanitizer II or equivalent per gallon of warm water (about 120° F).

5.1.4 Individually rinse respirators in warm water, ensuring that all check valves are rinsed completely.

5.1.5 Dry respirators completely either by air drying or with a towel.

5.1.6 Perform inspection per step 5.1.

5.2 Inspections

5.2.1 Frequency of inspections

a. All respirators shall be inspected and inspections documented on Attachment 1, Respirator Inspection and Maintenance Form, at the following times:

1. Upon initial receipt.

2. Following cleaning or maintenance.

3. At least monthly for respirators designated as ready for use.

5.2.2 Inspection of Full Face Air Purifying Respirators

a. Inspection of full face pieces should include:

1. Verify that there are no breaks, wear or loss of elasticity in straps or suspensions and that the buckles are functioning properly.

2. Verify that there is no excessive wear, holes, loss of elasticity, deformed shape, etc., in the face piece material (neoprene, silicone, etc.).

3. Verify the integrity of the face piece by ensuring that there are no tears, mold defects, cracks, or excessive scratches. Verify proper mounting of facepiece.

4. Verify that the canister or cartridge mounts and threads are in good condition and that they are free of cracks or excessive wear.

5. Ensure that canister or cartridge gaskets (where applicable) are in place and not cracked or excessively brittle.

6. Check for integrity of the inhalation and exhalation valve and seals.

7. Ensure that the speaking diaphragm assembly, Mylar diaphragm, and diaphragm gasket are in place and the assembly is tight.

8. Check all clamps and connections for tightness.

5.2.3 Inspection of half face pieces should include all the same areas as a full face respirator except the lens.

5.2.4 Inspection of cartridges and filters

a. Cartridges, canisters and filters should be visually inspected for damage created by handling and shipping.

b. Presence of proper labels should be checked.

5.3 Maintenance of Respirators

5.3.1 Follow the respirator manufacturer's manuals for maintenance and for any associated assembly or disassembly.

a. Document respirator maintenance on Attachment 1.

b. After performing maintenance, perform an inspection per step 5.2.

5.4 Storage of Respirators

5.4.1 After the inspection is completed, place the respirator with straps loose inside respirator facepiece into a clear bag and seal it.

5.4.2 Store the respirator with the lens down in the designated storage location.

6.0 RECORDS/REPORTS/NOTIFICATIONS

Records shall be collected in pair (Attachment 1 & 2) per event. Forward the completed Attachment 1 to the Health Physics Supervisor for review ***and filing. All records shall be maintained in Document Control.***

7.0 ATTACHMENTS

7.1	Attachment 1	Respirator Inspection and Maintenance Form
7.2	Attachment 2	Radiological Surve Data Sheet

Attachment 1

urvey Reference Number: _____ Date: _____

ignature of individual performing maintenance: _____

RESPIRATOR INSPECTION AND MAINTENANCE DAILY REPORT

1. Respirators will be washed with a soft brisle brush in hot water (120° F.) using approved sanitizer solution in the concentration of one packet per one gallon of hot water.

2. Respirators will be rinsed individually using warm running water. Ensure all check valves are completely rinsed.

3. Dry respirators completely. The preferred method will by to place them on a rack and allow them to air dry.

4. Check all sealing surfaces, check valves, gaskets, and straps for deterioration. Note discrepancies below.

5. Ensure that check valves operate freely, using a blunt instrument which will not damage the soft rubber valve.

6. Place in ziplock bag and seal.

7. Return this form to Health Physics Control Line for forwarding to Health Physics Supervision.

SERIAL NUMBERS OF MAINTAINED RESPIRATORS

_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Note any damage, repairs, or discrepancies below:

_____

_____

_____

Attachment #2

RADIOLOGICAL SURVEY DATA SHEET - WEST CHICAGO FACILITY

ITEM DESCRIPTION	Survey of used respirators					
CONTAMINATION ACCEPTANCE CRITERIA	Fixed Alpha: <100 dpm/100 cm^2			Fixed Beta-Gamma: <1000 dpm/100 cm^2		No Removable
REFERENCE #	YR	MO	DAY	ITEM 98	NO.	PERFORMED BY
PHA SURVEY STRUMENTATION				BETA SURVEY INSTRUMENTATION		

ESPIRATOR SN AND TYPE	SMEAR NUMBER	ALPHA ACTIVITY		BETA-GAMMA DIRECT	ACCEPTED OR REJECTED
		FIXED	REMOVABLE		

MARKS: All units in dpm/100cm^2

VIEWED AND APPROVED BY: DATE:

OPERATION OF THE MODEL 8020 PORTACOUNT PLUS

FOR QUANTITATIVE RESPIRATOR FIT TESTING

KERR-McGEE CHEMICAL CORPORATION

WEST CHICAGO FACILITY

REVIEWED BY: Jeffrey L. Williams DATE: 5-2-95
Quality Assurance Supervisor

REVIEWED BY: Matt Kby DATE: 5-3-95
Site Manager

APPROVED BY: R. A. Thompson DATE: 5/16/95
Project Manager

PROCEDURE NO: 336 REVISION NO: 1

OPERATION OF THE MODEL 8020 PORTACOUNT PLUS FOR QUANTITATIVE RESPIRATOR FIT TESTING

1.0 SCOPE

1.1 Purpose

To establish a procedure for the operation of the Model 8020 Portacount Plus Fit Test System for quantitative respirator fit testing, and standard instructions to be followed in conducting respirator fit testing of personnel.

1.2 Applicability

All personnel who are required to wear half-face or full-face respiratory protective devices.

2.0 REFERENCES

2.1 32 Illinois Administrative Code, Parts 310 and 340, Standards for Protection Against Radiation

2.2 32 Illinois Administrative Code, Part 400, Notices, Instructions and Reports to Workers; Inspections

2.3 West Chicago Project, Health and Safety Plan for Decommissioning Activities at the Kerr-McGee Chemical Corporation Rare Earths Facility, West Chicago, Illinois

2.4 Technical Manual for the TSI Model 8020 Portacount Plus.

2.5 West Chicago Project, Respirator Protection Training WCP 334.

3.0 DEFINITIONS

3.1 Fit Factor (FF)

A calculated value of protection for a particular respirator on a particular person based upon a series of tests. It is used to determine the adequacy of the respirator fit.

3.2 Protection Factor (PF)

The protection factor is a measure of the degree of protection afforded by a respirator, and is defined as the ratio of the concentration of airborne radioactive material outside the respirator to that inside the respirator under conditions of use.

4.0 REQUIREMENTS

4.1 Prerequisites

4.1.1 Individuals shall be clean shaven and shall not have facial hair styles that could interfere with the respirator fit, form, or function.

4.1.2 Each individual to be fit tested shall have completed respirator training *per reference 2.5.*

4.1.3 ***Each individual to be fit tested, within the past 12 months shall have had a determination by a physician, that the individual is physically able to use respiratory protection equipment.***

4.1.4 Individuals requiring respirator glasses must have their glasses with the manufacturer's approved frames present for the fit test. ***Contact lens can not be worn during the use of full face respirator.***

4.1.5 Individuals to be fit tested shall not smoke for at least 30 minutes prior to fit testing.

4.2 Tools, Material, Equipment

4.2.1 TSI Portacount ***Plus Model 8020.***

4.2.2 Sampling tube with adaptor.

4.2.3 Respirator(s) with probed facepiece.

4.3 Precautions, Limits

4.3.1 Ensure the Portacount Plus is operated in the upright position only. If it is run in an inverted position, alcohol may clog the nozzle or coat the optics.

4.3.2 Ensure the instructions in the operating manual are followed exactly when adding alcohol to ***Model 8020*** so that the ***Portacount Plus*** does not get flooded or air is not taken into the instrument through the alcohol fill port.

4.3.3 Smoking shall not be permitted in the fit test room. Active smoking will cause problems with quality control and test results.

4.4 Acceptance Criteria

4.4.1 The minimum passing fit factor will be 100 for half-face masks and 500 for full-face masks.

4.4.2 These values are 10 times the allowed PFs. This factor conservatively ensures that the respirator user achieves a satisfactory fit under field conditions.

5.0 PROCEDURE

5.1 Setup and Operational Checks

5.1.1 The Portacount Plus must be operated in an upright position only.

5.1.2 Start the Portacount Plus by pressing the "ON/OFF" key. The LCD Display should countdown from 60 seconds while the instrument warms up.

> ***NOTE***
> ***The HEPA Filter should be left attached to the sample tube (labeled "S"), on the twin tube assembly, whenever the Portacount Plus is turned on but not in use.***

5.1.3 Before performing a Fit Test you will need to make sure the Portacount Plus has alcohol in it. Then you should perform a Zero Check and a Max Fit Factor Check to make sure everything is working properly. The Zero Check is the most important and should be performed each time the Portacount is turned on. The Max FF Check should be done once a day.

5.1.4 Zero Check the Portacount by performing the following steps:

a. *Turn the Portacount Plus on and put it into Count Mode. The HEPA Filter should not be attached during this step. Make sure that you can measure a reasonable ambient particle concentration. This will normally be a value between 3000 and 50,000 but could be higher in some cases (ref. 2.4).*

b. *Attach the supplied HEPA filter to the Sample tube (labeled "S")on the twin tube assembly and observe the particle concentration on the display. It should drop quickly to zero (0.00)in 30 seconds. An occasional value of 0.60 or 1.20 is acceptable for this zero check, but should read 0.00 most of the time.*

c. *If the Portacount Plus will not Zero Check, there is a problem with the system and must be corrected before performing a Fit Test. See Technical Manual (Reference 2.4).*

5.1.5 *Perform the Max FF Check by following these steps:*

a. *Perform a Zero Check as described earlier in 5.1.4 of this procedure. The Max FF Check cannot be performed if the Zero Check fails.*

b. *Put the Portacount Plus in the Fit Test Mode.*

c. *Attached the supplied HEPA filter to the sample tube and wait 30 seconds.*

d. *Initiate a fit test by pressing the TEST START/STOP key.*

e. *At the completion of one test cycle (exercise), a fit factor of at least 50,000 should be displayed. If the fit factor is below this number, allow the test to continue for another cycle. If the fit factor remains below 50,000, there is a problem with the system and must be corrected before performing a Fit Test. See the Technical Manual (Reference 2.4) for system check and corrections.*

f. *Press the TEST START/STOP key to end the test.*

5.2 Respirator Fit Testing

5.2.1 ***Enter into the computerized data file (using the Portacount)*** the test subject's name, social security number ***(or I. D. number)***, company, respirator type/size and ***all other entries as listed*** on ***a Fit Test Record (reference example computer generated report - Attachment 1).***

5.2.2 Attach the Sample tube (labeled "S")of the twin tube assembly to the sample port on the test subject's respirator. The HEPA Filter should be removed from sample tube prior to being attached to subject's respirator.

5.2.3 Individuals may use gas permeable and soft contact lenses while wearing full-face respirators, providing the individual meets the following requirements:

a. The individual has worn the contacts for at least 3 months.

b. The individual is wearing the contacts at the time of fit testing.

5.2.4 Have the subject put on the respirator.

5.2.5 Have the subject perform a negative and positive pressure fit check.

5.2.6 Have subject breath normally for about one minute to clear room atmosphere from inside the mask.

5.2.7 To begin a fit test, activate the <u>Begin Test</u> menu and select <u>Start Fit Test</u>. You will be presented with the TEST ID window. This is where you identify the individual being tested, the respirator used and various other important facts. Fill in the information on each line. See example information below:

TEST ID

LAST NAME.....: DOE
FIRST NAME.....: JOHN MI.
ID NUMBER.....: 012-34-5678 (S.S.#)
NEXT TEST DUE.....: MM-DD-YY
OPERATORS NAME.....: YOUR NAME
RESPIRATOR MODEL...: F/F or H/F
-SIZE..... : S,M,L or H/F
-MANUFACTURER. : MSA or GPT
-APPROVAL #... : N/A
NOTES..... : Tested with glasses,
: contacts, etc.

When you first open the TEST ID window, the cursor will be on <START>. If the TEST ID fields are already filled in correctly you can just press <ENTER> to start the fit test. If you need to change any of the TEST ID fields, use the <TAB> key to position the cursor on the field and then make the changes. After you have filled in the fields, press the <TAB> key to access the command box, select <START> and then press <ENTER>. The 60 second warm-up cycle counted down on the Portacount Plus display must be completed before you can start a test, otherwise you will get a Device timeout error.

The fit test begins immediately. The Portacount Plus will be put into External Control Mode by the computer and the first exercise description "NORMAL BREATHING" will appear in large letters on the screen.

5.2.8 The following exercises are to be performed. Each exercise lasts 60 seconds:

a. Normal Breathing (NB). In the normal standing position, without talking, the subject shall breathe normally.

b. Deep Breathing (DB). In the normal standing position, the subject shall do deep breathing, pausing as necessary so as not to hyperventilate.

c. Turning head side to side (SS). Standing in place, the subject shall slowly turn his/her head from side between the extreme positions to each side. The head shall be held at each extreme position for at least 5 seconds.

d. Moving head up and down (UD). Standing in place, the subject shall slowly move his/her head up and down between the extreme position straight up and the extreme position straight down. The head shall be held at each extreme position for at least 5 seconds.

e. Reading (R). The subject shall read out slowly and loud so as to be heard clearly by the test conductor or monitor. The test subject shall read the "rainbow passage" from Attachment *2. **This reading will force the subject to use a multitude of facial expressions during testing.***

*f. **Normal Breathing (NB).***

*5.2.9 **The computer will sound an audible "BEEP" when it is time for each new exercise. The description of each exercise will appear in large letters on the screen. All you have to do is tell the person being tested what the next exercise is and when to start it. If your pre-fit test training program was thorough, you might be able to simply have the individual watch the screen and proceed through the fit test without further direction from you.***

*5.2.10 **Take this time to study the screen in front of you. This is the Fit Test Screen where the progress of the fit test is monitored. Notice the following elements of the Fit Test Screen:***

*a. **The word Terminate is visible at the top left side of the screen. The "T" in Terminate is capitalized meaning that the <T> key will cause the fit test in progress to be terminated.***

*b. **The FF PASS LEVEL is shown at the bottom center of the screen. Any exercise or overall fit factor that is below this number will be considered a FAIL.***

*c. **If an exercise fit factor is low enough such that it will be impossible for the overall fit factor to reach a passing value, the message***

NOTICE
Max. Overall FF < XXXX

will appear at the bottom of the screen. The XXXX will be the current fit factor pass level. When this message appears, you will most likely want to terminate the test by pressing the <T> key because it will not be possible for the individual being tested to pass this test regardless of how high the rest of the exercise fit factors are. At this time the Overall Fit Factor will be FAIL.

d. ***The message TEST COMPLETE will appear in large letters after the last exercise is finished. At this time the Overall Fit Factor is computed and displayed along with a PASS or FAIL message.***

5.2.11 A Fit Test Report (reference Attachment #1) will automatically print at the completion of each Fit Test, if the computer is connected to a printer. Press any key to return to the Main Screen or press <F1> to begin a new test.

5.2.12 Disconnect the sample line from the respirator and instruct the test subject to remove the respirator.

5.2.13 The minimum passing final fit factor is 100 (1E2) for half-face masks and 500 (5E2) for full-face respirators.

5.2.14 Sign and date the bottom of Attachment 2.

5.2.15 Forward Attachment 2 to health physics supervision for review.

6.0 RECORDS/REPORTS/NOTIFICATIONS

6.1 The Fit Test Report shall be signed by the individual being tested and the tester. All records will be reviewed and singed by the Health Physics Supervisor prior to project filing.

6.2 ***DELETED***

7.0 ATTACHMENTS

7.1 Attachment 1 ***Fit Test Report (example)***

7.2 Attachment 2 ***Rainbow Passage (exercise material)***

Attachment 1

Last Name. . . . . .Doe
First Name. . . . . .John

PORTACOUNT PLUS FIT TEST SOFTWARE
FitPlus Version B
TSI Incorporated

FIT TEST REPORT

Last Name . . . . . : Doe
First Name . . . . . .: John
Social Security/ID Number . . . . . .: 234567890
Next Test Number . . . . . : 4/19/97
Operator Name . . . . . : Black
Respirator Model . . . . . : GPT
-Size . . . . . .: H/F
-Manufacturer . . . . . .: GPT
-Approval Number . . . . . .: H/F
Notes. . . . . :
. . . . . :
. . . . . :

Test Date . . . .: 04/19/95
Test Time . . . . . : 1:06 pm

TEST DATA

Fit Factor Pass Level: 100

Ex.	Ambient (Part/CC)	Mask (Part/CC)	Fit Factor	Pass/Fail
NB	4890	13.20	370.0	PASS
DB	5000	0.81	6160.0	PASS
SS	5250	3.86	1360.0	PASS
UD	5870	6.12	959.0	PASS
T	6110	3.73	1630.0	PASS
NB	5860	1.86	3150.0	PASS

Operator/Tester _____ Date _____

Name _____ Date _____

Attachment 2

RAINBOW PASSAGE

(exercise material)

When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above , and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond reach, his friends say he is looking for the pot of gold at the end of the rainbow.

DRAFT PROCEDURES

Draft Operations' Drilling and Soil Sampling Procedure

Draft Operations' Borehole Abandonment Procedure

Draft Operations' Gamma Logging Procedure

August 30, 1996

OPERATIONS' DRILLING AND SOIL SAMPLING PROCEDURE

KERR-McGEE CHEMICAL CORPORATION

WEST CHICAGO FACILITY

REVIEWED BY: Jeffrey L. Williams DATE: 5/11/95
Quality Assurance Supervisor

REVIEWED BY: Thomas Johnson DATE: 5/11/95
Operations Manager

APPROVED BY: R. A. Thompson DATE: 5/11/95
Project Manager

PROCEDURE NO: WCP 655 REVISION NO: 1

OPERATIONS' DRILLING AND SOIL SAMPLING PROCEDURE

1.0 SCOPE

1.1 Purpose

The purpose of this procedure is to present protocol for drilling soil borings and sampling of soil by mechanical methods. This procedure presents drilling and sampling methods which can be used during delineation ***drilling*** investigations. The procedure also describes responsibilities of personnel and contractors conducting drilling and sampling activities.

1.2 Applicability

This procedure applies to samples collected for radiological analysis. Soil samples will be collected from the borehole termination depth. The field geologist/engineer will coordinate the sampling efforts. This procedure will be used primarily to quantify the vertical extent of ***contamination.***

2.0 REFERENCES

2.1 Soil Sampling Procedure for Field Verification System and the Field Portable Units at the Kerr-McGee Rare Earths Facility, August 1994.

2.2 US Nuclear Regulatory Commission, NUREG/CR-5849, Manual for Conducting Radiological Surveys in Support of License Termination, June 1992.

2.3 Kerr-McGee West Chicago Project-Health and Safety Plan (HASP).

2.4 Kerr-McGee West Chicago Project-Delineation Drilling Protocol.

2.5 ASTM specifications D1586 and D1587

2.6 Environmental Protection Agency (EPA) publication, SW-846

2.7 Kerr-McGee West Chicago Project-WCP 320 Radioactive Material Shipments

2.8 Kerr-McGee West Chicago Project-Lockheed Soil Sampling Procedure #KMS-102

2.9 Kerr-McGee West Chicago Project-WCP 345 Surveys for Surface Contamination and Release of Equipment for Unrestricted Use

3.0 DEFINITIONS

NONE

4.0 REQUIREMENTS

4.1 The current provisions of the HASP shall be followed for all aspects of the work.

4.2 Identification of borehole locations is in accordance with each Request of Approval of Delineation Drilling.

5.0 PROCEDURE

5.1 Responsibility

The Operations Manager or designee is responsible for implementing this procedure. In most cases this procedure will be implemented via contract with a qualified vendor. The Operations Manager (or designee) will appoint a Field Engineer/Geologist to supervise field activities, maintain records and otherwise conduct QC duties as described in this procedure.

5.2 Equipment and Materials Management

Downhole tools and samplers are cleaned in accordance with the decontamination procedures in this document. Fuel, lubricants, and other similar substances are handled in a manner consistent with accepted safety procedures and standard operating practices. Machinery leaks which could impact surface or subsurface materials are corrected. Sampling tools are not stored near or in areas which could be affected by these or other sources.

If drilling is performed off-site, cuttings and fluids will be placed in 55-gallon drums and transferred to the facility. Water used for drilling will be obtained from a nearby potable water source.

5.3 Drilling Procedures

In general, mechanical drilling methods are used for borings which extend below about ten feet deep. A field engineer/geologist observes drilling activities and maintains a log of these activities. The field engineer/geologist also keeps a detailed, descriptive log of materials penetrated by the boring. An example form for the soil boring log is shown on Attachment 1. The estimated termination depths for borings will be shown on the Request for Approval of Delineation Drilling. The depth is expected to average about 25 feet.

Mechanical drilling in soils will be performed with equipment and procedures compatible with the latest revision of ASTM specifications D1586 or D1587 or another similar method judged acceptable by the field engineer/geologist. Drilling will be accomplished using soil augering procedures. If this technique is not successful, another drilling method considered appropriate to conditions encountered will be used. In some subsurface materials, such as cohesionless sand, gravel, or boulders, it might be necessary to advance a ***temporary casing*** to maintain an open borehole during drilling.

Drilling procedures used within the boring will be changed if conditions change, such as the occurrence of unexpected lithologies, or if the initial drilling technique results in unacceptable penetration rates or an unstable borehole. The drilling procedure used must be ***compatible with ASTM*** specifications D1586 and D1587 or another similar method judged acceptable by the field engineer/geologist. If borehole caving is experienced, a natural bentonite drilling fluid additive can be used only after approval by the Operations Manager.

Drilling equipment ***coming in contact with soil*** will be cleaned ***with a high-pressure, potable water jet*** prior to use at each new borehole. Sampling ***equipment will be*** cleaned before each use as described below.

The portion of sampling equipment that contacts the sample will be cleaned prior to use. The standard cleaning procedure is as follows:

- scrape with wire brush to remove soil particles,
- wash in a solution of distilled or potable water and phosphate-free detergent (such as Alconox),
- rinse with distilled water,
- air dry, then
- use equipment, or if not used immediately, pack cleaned equipment in plastic bags or aluminum foil.

Decontamination will be performed at the site's decontamination pad or at the drilling site. If drilling is performed off-site, decontamination rinse water will be collected and placed in 55-gallon drums and transferred to the site's decontamination pad sump.

After the gamma logging has been performed, the boring should be abandoned according to ***site procedure WCP 656***.

5.4 Sampling Procedures

A field engineer/geologist will observe sampling activities and will maintain a log of these activities ***in a Field Logbook (ref. 2.8)***. The field engineer/geologist also will keep a detailed, descriptive log of materials penetrated by the boring and a complete soil sampling record. The form to be used for the field record has a scale of one inch equals five feet, and is provided in Attachment 1(Soil Boring Log).

5.4.1 Sampling Locations

Lithologic logging of the borehole will be done from cuttings. One soil sample will be collected from the bottom of each boring for radiological analysis. Additional soil samples may be collected at the field geologist's discretion during drilling.

5.4.2 Sampling Methods

Mechanical soil sampling in boreholes is performed in accordance with ASTM specifications D1586 or D1587 or another, similar, method judged acceptable by the field engineer/geologist. Samples are taken at locations specified in Section 5.4.1 above. Additional samples may be taken at intermediate depths in the event of poor sample recovery or changes in lithology. Good sample recovery is important, and procedures will be modified, as necessary, to improve sample recovery. Recovered soil samples are placed in properly labeled, clear glass jars, plastic bags, or sealed in thin-wall sampling tubes, as appropriate.

5.4.3 Sample Tracking ***and*** Chain of Custody

To establish the documentation necessary to track the sample from the time of collection ***to analysis***. ***The*** sample***'s unique*** identification and ***purpose shall be noted on the*** Sample Tracking Form ***which will*** accompany samples that are sent to the ***on site*** laboratory. (see reference 2.8).

Samples ***to be sent for offsite analysis*** will be ***identified on a Chain of Custody form, and*** handled, packed, and shipped in accordance with the Kerr-McGee Radioactive Material Shipments (see reference 2.7).

All potentially contaminated samples to be submitted to the laboratory will be screened for radiation in the field. Information obtained from this survey will be documented ***in*** the ***comments section of the Sample Tracking Form or Chain Of Custody Form as applicable.*** (see reference ***2.8 &*** 2.9).

Enter the complete information on the Sample Tracking Form:

- Sample Number

- Sample Matrix
- Sample Location
- Purpose of Sample Collection
- Include applicable comments regarding the sample, location, weather, conditions, or other factors that may be relevant.
- Collected by (sampler's name)

5.4.4 Quality Control

To evaluate the variance in the laboratory analyses, ***laboratory*** duplicates will be ***analyzed as specified by the Calibration Procedures***. These QC samples will be identified and noted ***on the laboratory reports.***

5.4.5 Data Review

Entries in the Field Logbook will conform to the requirements of reference 2.8.

The field geologist/engineer will review the Field Logbook, sampling tracking forms, soil boring log, etc. and resolve any discrepancies. ***Log*** pages ***will*** be signed and dated to ***document*** the pages ***have been*** reviewed.

5.5 Management *of* Potentially Contaminated Material

Water sprays will be ***the primary method*** used to reduce the amount ***of dust*** generated by drilling and sampling activities. The following measures are used to manage ***drill*** cuttings and dust.

- If drilling is performed off-site, cuttings will be placed in 55-gallon drums (or other means of containment).
- If the field engineer/geologist observes visible dust from drilling and sampling activities, then the field engineer/geologist will require periodic wetting of cuttings with potable water. The frequency of wetting the cuttings is based on the ***dryness*** of ***the*** cuttings and wind conditions.

If visible dust continues, the field engineer/geologist may chose to:

- set up a windscreen to decrease wind velocity on the down wind side, or
- stop drilling and sampling activities until the wind velocity decreases.

The field engineer/geologist records the applied dust control measures in the field logbook.

5.6 Health and Safety

Personal protective equipment and clothing, as required by the Health and Safety Plan, will be used when collecting and handling contaminated soils. ***Per site procedure, drilling activities will be conducted in accordance with a special work permit.***

6.0 RECORDS/REPORTS/NOTIFICATIONS

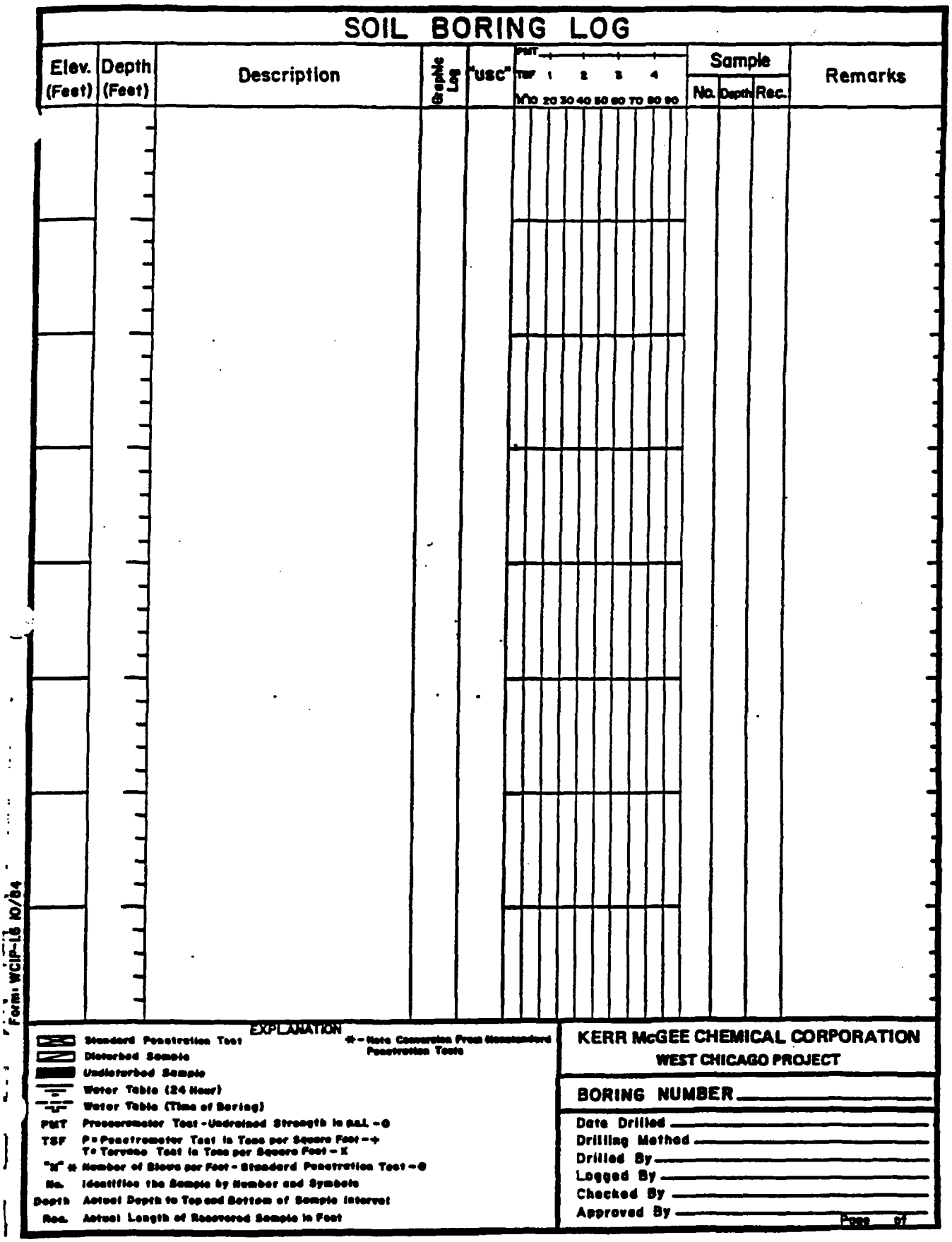
6.1 The following documents will be maintained as quality records:

- Field Logbooks
- Sampling Tracking Forms
- Results of all Calculations and Statistical Analyses Performed
- Soil Boring Log

7.0 ATTACHMENTS

7.1 Soil Boring Log - Attachment 1

ATTACHMENT 1



OPERATIONS' BOREHOLE ABANDONMENT PROCEDURE

KERR-McGEE CHEMICAL CORPORATION

WEST CHICAGO FACILITY

REVIEWED BY: Jeffrey L. Williams DATE: 5/11/95
Quality Assurance Supervisor

REVIEWED BY: Thomas Jiskra DATE: 5/11/95
Operations Manager

APPROVED BY: R. A. Thompson DATE: 5/11/95
Project Manager

PROCEDURE NO: WCP 656 REVISION NO: 1

OPERATIONS' BOREHOLE ABANDONMENT PROCEDURE

1.0 SCOPE

1.1 Purpose

The purpose of this procedure is to present protocol for abandoning boreholes that will not be completed as wells.

1.2 Applicability

This procedure applies to boreholes drilled during excavation delineation investigation.

2.0 REFERENCES

2.1 Kerr-McGee West Chicago Project-Delineation Drilling Protocol.

3.0 DEFINITIONS

NONE

4.0 REQUIREMENTS

4.1 The current provisions of the HASP shall be followed for all aspects of the work.

5.0 PROCEDURE

5.1 Responsibility

The Operations Manager or designee is responsible for implementing this procedure. In most cases this procedure will be implemented through contract with a qualified vendor. The Operations Manager or designee will appoint a Field engineer/geologist to supervise field activities, maintain records and otherwise provide QC as provided in this procedure.

5.2 Boring Abandonment Procedure

Borings that are not used for the installation of groundwater wells will be abandoned. The abandoned boring is sealed according to the procedures established by local, state, or federal regulatory agencies. The borings are abandoned by plugging them with the grout mixture described below. If the boring is less than ten feet deep, the grout is poured from the surface. If the boring is greater than ten feet deep, the grout is pumped through a tremie pipe placed at the bottom of the boring. Grout is added until undiluted grout is a few inches from the ground surface.

Twenty-four hours after abandonment, the field engineer/geologist checks the abandoned boring for grout settlement. If necessary, the field engineer/geologist directs the contractor to place additional grout. This process is repeated until firm grout remains at the surface.

Boring locations not completed as groundwater wells are labeled and marked for subsequent surveying.

5.3 Grout Material

A Portland cement/sodium bentonite grout is used for grouting. The grout mixture consists of one 94-pound sack of cement and about three to five pounds bentonite for each 6.5 gallons of potable water used. Water used for grouting will be obtained from a nearby potable water source. Additives or cuttings are not to be added to the grout mixture. The grout materials are combined in an above-ground rigid container or mixer and mechanically mixed to produce a thick, lump-free mixture. The mixed grout is recirculated through the grout pump prior to placement, (if it is to be placed using a tremie pipe).

6.0 RECORDS/REPORTS/NOTIFICATIONS

6.1 The following documents will be maintained as quality records:

- Field Logbooks ***(documentation of grout mixture and placement)***

7.0 ATTACHMENTS

NONE

OPERATIONS' GAMMA LOGGING PROCEDURE

KERR-McGEE CHEMICAL CORPORATION

WEST CHICAGO FACILITY

REVIEWED BY: Jeffery L. Williams DATE: 5/11/95
Quality Assurance Supervisor

REVIEWED BY: Thomas Gilmore DATE: 5/11/95
Operations Manager

APPROVED BY: R. A. Thompson DATE: 5/11/95
Project Manager

PROCEDURE NO: WCP 657 **REVISION NO: 1**

OPERATIONS' GAMMA LOGGING PROCEDURE

1.0 SCOPE

1.1 Purpose

This procedure addresses the gamma logging to be performed during delineation drilling investigations. The gamma logging will be performed to examine the extent of affected soil with combined radium (Ra-226 and Ra-228) concentrations in excess of 5 pCi/g above background.

1.2 Applicability

This procedure applies to boreholes drilled and gamma logged during delineation drilling investigations.

2.0 REFERENCES

2.1 Kerr-McGee West Chicago Project-Delineation Drilling Protocol.

3.0 DEFINITIONS

NONE

4.0 REQUIREMENTS

4.1 The current provisions of the HASP shall be followed for all aspects of the work.

5.0 PROCEDURE

5.1 Responsibility

The Operations Manager or designee is responsible for implementing this procedure. In most cases this procedure will be implemented through contract with a qualified vendor. The Operations Manager or designee will appoint a Field engineer/geologist to supervise field activities, maintain records and otherwise provide QC as provided in this procedure.

5.2 Calibration

Calibration standards for gamma logging will be prepared at the site, or previously constructed calibration standards will be used. The calibration standards are used to convert the counts per second (cps) recorded by the logging equipment to equivalent combined radium activity in pCi/g.

A minimum of two calibration ***measurements*** will be used. ***Each measurement will be made in a calibration drum constructed as described below. Each drum will be filled with soil containing an approximately uniform concentration of radioactive material throughout. The range of activity in the set of drums will include the range of interest.*** A set of calibration drums is available on site. If additional drums are required they will consist of ***radioactive*** soil placed into a large drum. The center of which ***is cased with a material simulating the logging geometry, (ie. pvc pipe; geo-probe, hollow stem auger.)*** The soil surrounding the pipe will be well mixed, and compacted in four lifts in the drum. Each lift will be divided into four quadrants, and a soil sample will be taken from each quadrant of each lift, and submitted for radiological analysis. The conversion factor of cps to pCi/g will be estimated from the average results of these analyses. The conversion factor is taken from the slope of the line relating the cps ***measured in each drum*** to the activity ***in*** the ***drum***.

5.3 Method

The vehicle carrying the logging equipment is brought to the borehole, and the tripod and pulley assembly are set up over the borehole. The gamma probe is placed into the top of the borehole, so the detector is zeroed at the ground surface. After zeroing the probe, the probe is lowered to the bottom of the borehole. The logging is performed as the probe is raised to the surface. A logging rate of 10 readings per foot has been used previously at the Site, and will be used for this logging. ***The logging geometry is recorded in the field log book, (ie. pvc pipe; geo-probe, hollow stem auger.)***

5.4 Data Processing

The gamma logs will be processed for dead time correction, conversion from cps to pCi/g, filtering, and plotting.

Dead-time correction is necessary when the count rate is more rapid than the resolving time of the instrument. The equipment manufacturer establishes the correction factor, and the equation to correct the count rate.

The measured counting rate at each borehole will be converted to activity by use of the conversion factor ***determined for the logging geometry.*** The use of the conversion factor assumes a linear relationship between counting rate and activity.

5.5 Output

The corrected, converted, and filtered gamma logs will be plotted. Each plot will identify the borehole that was logged. Information about the gamma logging equipment or operation will be recorded so that information can be recovered if necessary.

The logging results will be plotted on maps to illustrate the horizontal extent of soil containing combined radium activity in excess of 5 pCi/g above background. The vertical extent of affected soil will be illustrated from cross-sections or vertical depth information will be included on the horizontal extent maps.

6.0 RECORDS/REPORTS/NOTIFICATIONS

6.1 The following documents will be maintained as quality records:

- Gamma Logs
- Data Plots
- ***Field Logbook***

7.0 ATTACHMENTS

NONE